

SnowEx: a NASA airborne campaign leading to a snow satellite mission

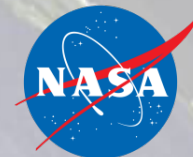
SnowEx update: January 19, 2017

SnowEx Team/contributors to this report: Edward Kim, Charles Gatebe, Amy Misakonis, Jerry Newlin, Kelly Elder, Ludovic Brucker, Chris Hiemstra, HP Marshall, Stephen Rorke, Eugenia De Marco, Tom Painter, Delwyn Moller, Amanda Leon, Rani Gran, Julie Malingonski

Sponsored by NASA Headquarters/Terrestrial Hydrology Program Manager: Jared Entin



Agenda Outline



- Welcome – E. Kim/C. Gatebe
- Winter Ground Logistics Updates – K. Elder/L. Brucker/C. Hiemstra/HP Marshall
- Aircraft Logistics Updates:
 - NRL P-3 (AESMIR, CAR, IR Sensors, SnowSAR) – S. Rorke/E. Marco
 - King Air/ASO (Lidar & Spectrometer) – T. Painter
 - G-3/UAVSAR & GLISTIN-A – D. Moller/Y. Lou
- Data Management Updates - Amanda Leon
 - CPLX Data Metrics
- SnowEx Weather Products/Plans – NWS/J. Malingowski
- Public Outreach – R. Gran
- Schedule & General Logistics Updates – A. Misakonis/J. Newlin
- Q&A



WINTER GROUND LOGISTICS UPDATES

K.Elder/L. Brucker/C.Hiemstra/HP Marshall



Ground Team



SAFETY * SAFETY * SAFETY * SAFETY * SAFETY

Number one issue!!!!!!!!!!!!

- ❖ *Safety training on site before any field work begin.*
 - *Will train each group weekly*
- ❖ *Required Personal Protection Equipment (PPE)*
 - *Will supply when necessary (e.g. helmets)*
- ❖ *Group safety and rescue equipment*
- ❖ *Daily safety sessions*
- ❖ *Detail communication plan*
 - *Redundant equipment and network*
- ❖ *Emergency incident plan*

Questions → kelly4snowex@gmail.com



Ground Team



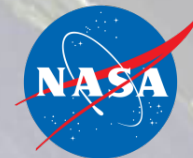
PERSONAL EQUIPMENT

- ❖ *Get the correct stuff now*
- ❖ *Do NOT show up in Colorado expecting to buy it on site or on your way to the field site*
- ❖ *If you show up with inadequate equipment, you will be asked to leave*
- ❖ *This isn't a personal issue, it's a SAFETY issue*
- ❖ *If you have questions, ask!*

kelly4snowex@gmail.com



Clothing



- ✓ Winter boots - Boot liners
- ✓ Warm socks – many pairs (minimum 5)
- ✓ Synthetic long underwear bottoms (2 pr)
- ✓ Fleece pants
- ✓ Waterproof snow pants (shells, bibs, etc.)
- ✓ Gaiters
- ✓ Synthetic long underwear shirts (2)
- ✓ Warm shirts – wool or synthetic (at least 2)
- ✓ Fleece jacket
- ✓ Down jacket
- ✓ Waterproof shell that will go over all your layers
- ✓ Warm hat (2)
- ✓ Balaclava or hood that attaches to your coat
- ✓ Goggles
- ✓ Sunglasses (2 pr)
- ✓ Warm gloves (3 pr)
- ✓ Mittens - for snowmobile or emergency (1 pr),
if you use daily or hands get cold easily (2 pr)



Gear



- ✓ Backpack/Rucksack (larger than 40 L, smaller than 60 L)
- ✓ Water bottle – 2 (1 L capacity) – good to have foam cover to slow freezing
- ✓ Thermos
- ✓ Sunscreen
- ✓ Lip balm
- ✓ Headlamp
- ✓ Multitool or pocketknife
- ✓ Some small roll of duct tape and/or rope
- ✓ Snowshoes
- ✓ Ski poles
- ✓ Skis only if you are really competent at travel in difficult conditions with a backpack
- ✓ If skis, then ski boots, poles, and skins
- ✓ Skis should be telemark, AT, or other substantial model.
- ✓ Alpine, light touring or skating skis are not acceptable.
- ✓ Fixed-heel bindings are not acceptable.



Skis

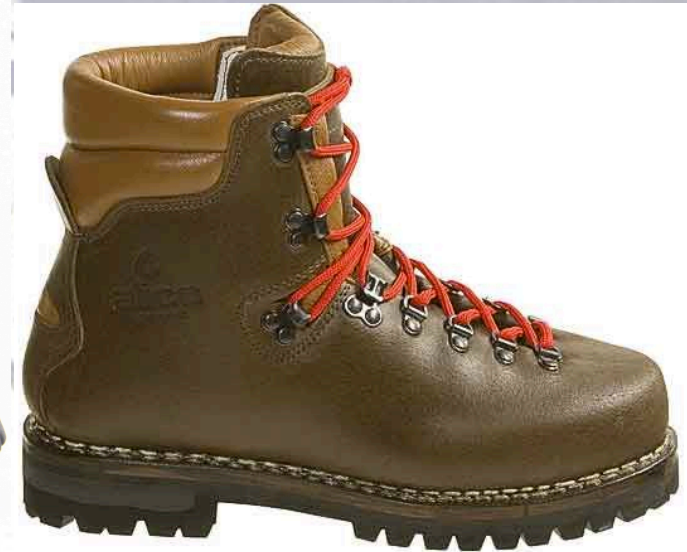
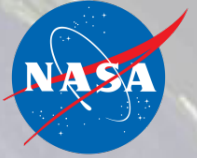


- ❖ Skis only if you are really competent at travel in difficult conditions, *with* a backpack
- ❖ If skis, then ski boots, poles, and skins
- ❖ Skis should be telemark, AT, or other substantial model.
- ❖ Alpine, light touring or skating skis are not acceptable
- ❖ Fixed-heel bindings are not acceptable



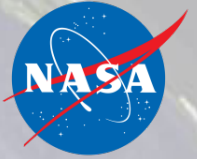


Boots – *no!*



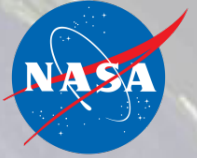


Boots — *no!*





Boots – *yes!*



Brands:

Sorel

Baffin

Sources:

REI.com

Backcountry.com

Dicks Sporting Goods

Many others



Boots – *final thoughts*



- Don't buy anything that is not insulated
- Don't buy anything leather that's not also waterproof
- Don't buy anything called après ski
- Don't buy anything all rubber
- Don't buy anything endorsed by Brat Pit or Angel Jolly
- Don't buy anything called Muck, Duck, or...
- ✓ Insulated is essential
- ✓ Waterproof is essential
- ✓ High top is essential
- ✓ Vibram or similar lugged sole is good





AIRCRAFT LOGISTICS UPDATES



P-3 Schedule



- Test Flights 1/26-1/31
- Planned transit to Peterson AFB in Colorado Springs is 2/1 with SnowEx Campaign beginning 2/6
- First official flight likely 2/7
- 5 or 6, 8 hour flights are planned over the SnowEx sites (Grand Mesa, Senator Beck) and these will be spread over the campaign period of performance depending on weather conditions
- Transit back to PAX will occur during the last week of February with a fly over Michigan for a separate, but related effort (See back up)



P-3 Status



Modification/Installation update

as of 1/19/2017

- All instruments and support pieces now at Pax at VXS-1 and/or PSI
- CAR nose Radome and Instrument installed.
 - Pass through plate connectors replaced, cables ready to run.
 - Computer rack ready to install; display rack being assembled
- AESMIR Rack populated/installed, Pass through plates populated, cables being run
 - BEP fairing parts fabricated, being assembled. BEP planned for Monday.
- IR/Visual sensor NADIR plate assembled with glass, thermocouples and installed
 - Supporting/mounting structure assembled and will be installed today
 - Cables run from NADIR port to operator position.
- SnowSAR equipment rack mount plate assembled, final installation today.
 - Pass through plate awaiting connectors for final assembly. Cables ready.
 - Antenna mount redesigned, fabrication and analysis in final stages
 - Interior cables run from lower rack to aft bulkhead and Operator station
- SnowSAR and IR operator station/rack installed.
- Final Electrical Power drawings being submitted for Flight Clearance today
- Waiting on final documents for NAVAIR on ASMIR fairing and CAR nose
 - Final flight clearance chop process underway. Hopeful for next week



ASO King Air Status

- Jan 25-28: Install
- Jan 29-30: Calibration Flight
- Jan 31-Feb 3: MMH for CA surveys
- Feb 3: Expected Transit to CO for SnowEx
- Feb 5- Feb 28: Planned SnowEx Support



JSC G-III Status



- JSC G-III plans to arrive Palmdale, CA on February 3 to pick up the L-band pod
- Aircraft is currently in the paint shop and will return to JSC on January 27
- Pod installation and ground testing will take ½ day
- After the first SnowEx L-band flight on Feb. 6, will switch to Ka-band pod on Feb. 7
- Currently don't anticipate any delays





Armstrong G-III/C-20A Status



- AFRC C-20A is currently in the hangar undergoing integration check with UAVSAR.
- However, aircraft will need repair work to be done on the wing/fuselage interface.
- Repair work is scheduled to commence on January 19 in Van Nuys, CA.
- Aircraft should be back in service sometime between Feb. 13 and Feb. 20.



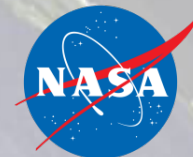


DATA MANAGEMENT UPDATES

Amanda Leon



Data Management at Grand Mesa



Two NSIDC data management staff will be at Grand Mesa each week of the winter campaign

Week 1

Shannon Leslie

DAAC Data Management Lead/Product Support Specialist

Amy Fitzgerrell

Product Support Specialist

Weeks 2 & 3

Amanda Leon

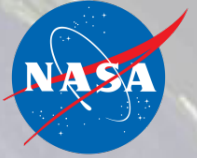
NASA DAAC Deputy Manager

Lindsay Sheridan

Data Operations



Data Management at Grand Mesa



- Shadow instrument collection teams
 - Gain insight into collection methods and end of data processing
 - Initiate data discussions with instrument POCs
- Field books
 - Provide QA review field books each day to identify and resolve missing/unclear values
- Field cameras
 - Change default filenames to include camera number
 - Ensure GPS signal acquisition before taking photos
- Data backups
 - Provide means for daily data backups to reduce risk of data loss during the campaign
 - Official transfer of data to NSIDC will be coordinated after the campaign



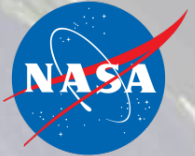
WEATHER PRODUCTS/PLANS



NWS/J. Malingowski



Weather Support from NWS Grand Junction for SnowEx



Daily (or twice daily) phone calls: Main updates on evening call focusing on conditions for the next day and brief summary for 1-3 days out. Brief update calls in morning as needed. Morning calls can utilize 12z GJT sounding for cloud levels.

- Should we schedule these or will they vary based on your operations? Best if we avoid briefings between 10 and 11 am/pm MST and 4 to 5am/pm.

Graphical/text email before evening phone call: brief text of current and future outlook (1-3 days) and graphic detailing conditions if applicable.

Requested Parameters and feasibility:

Ground (will provide in email PDF)

- Ground temperature profile
- Ground wind speed
- Precipitation
- Humidity
- Fog/Haze
- Safety Concerns

Aircraft (1000', 5000', 10000') - will provide in email PDF if known, otherwise will discuss on morning call

- Cloud cover (main product of interest).
- Temperature. Ground level would be of most interest
- Winds.
- Precipitation.
- Humidity.
- Fog/Haze, or if those are not available, then dew point
- Vertical-column visibility, or optical thickness.
- Satellite imagery of interest that highlights cloud cover or developing conditions (GOES, MODIS, etc)



PUBLIC OUTREACH

Rani Gran



Snow Ex Communications



Snow EX Media Messages:

The goal of SnowEx is to test new techniques and technology for measuring snow water extent from above so that we can develop a satellite to measure snow water extent globally.

Changes in snow water content has consequences. SWE are of significant interest to communities across the globe, in particular as it relates to the availability of fresh water, natural hazards, winter-dependent industries, and ecosystem impacts.

This is not just a NASA campaign. Snow experts Universities, other U.S agencies, and scientists from Canada and Europe are participating.



Snow Ex Communications

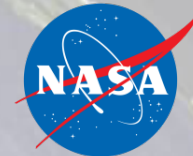


Snow Ex Media Day

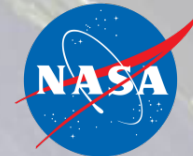
- Tentative Date: Tuesday Feb. 13. This could slide based on flight schedules. Ellen Gray and Joy NG from the office of communications will be there.
- Media Advisory will go out Jan. 17
- Participants: Ed Kim NASA Goddard, Frank McCormick, US Forest Service, Brian Domonkos, Natural Resources Conservation Service, Colo, Tom Painter JPL, LT. Denise Miller, NRL Pilot
- Facebook live 1:00 PM with Ed Kim, Frank McCormick and NRL pilot



SnowEx Communications

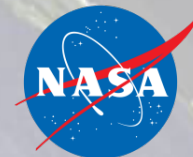


- NASA SnowEx overview feature will go out Feb 7, a day when flights start in Colorado.
- Snow Ex Technology feature will go out on media day, Feb 13
- Joy(Videographer) will fly on the first flight.
- We are in the process of enabling media to fly on the P-3. That would be 1 to 2 per flight. Numbers is dependent on seat availability. NRL PAO is working the waivers.
- We hope to get a freelance videographer to get video from the ground station in Grand Mesa, Colorado.
- Forest Service is taking the lead on working with media visits at the ground station.
- Social media products (Ellen and Joy)
 - Facebook live on the media day
 - 2 Snap chat stories
 - opportunities for scientists in the field to contribute



SCHEDULE AND GENERAL LOGISTICS

Amy Misakonis/J. Newlin



Q & A